

# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>HALOCARBON 2</b>	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. <b>PCT/US00/19863</b>	International filing date (day/month/year) <b>21 JULY 2000</b>	Priority date (day/month/year) <b>21 JULY 1999</b>
International Patent Classification (IPC) or national classification and IPC Please See Supplemental Sheet.		
Applicant <b>HALOCARBON PRODUCTS CORPORATION</b>		

1.	This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2.	This REPORT consists of a total of <u>4</u> sheets.  <input type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority. (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).  These annexes consist of a total of _____ sheets.
3.	This report contains indications relating to the following items: <ul style="list-style-type: none"> <li>I <input checked="" type="checkbox"/> Basis of the report</li> <li>II <input type="checkbox"/> Priority</li> <li>III <input type="checkbox"/> Non-establishment of report with regard to novelty, inventive step or industrial applicability</li> <li>IV <input type="checkbox"/> Lack of unity of invention</li> <li>V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</li> <li>VI <input type="checkbox"/> Certain documents cited</li> <li>VII <input type="checkbox"/> Certain defects in the international application</li> <li>VIII <input type="checkbox"/> Certain observations on the international application</li> </ul>

Date of submission of the demand  <b>21 FEBRUARY 2001</b>	Date of completion of this report  <b>28 SEPTEMBER 2001</b>
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231  Facsimile No. (703) 305-3230	Authorized officer  <div style="display: flex; justify-content: space-between;"> <div>EDWARD CAIN</div> <div style="text-align: right;">             Jean Proctor              Paralegal Specialist           </div> </div> Telephone No. (703) 308-0661

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US00/19863

## I. Basis of the report

## 1. With regard to the elements of the international application:\*

- ☒ the international application as originally filed
- ☒ the description:  
pages 1-13, as originally filed  
pages NONE, filed with the demand  
pages NONE, filed with the letter of
- ☒ the claims:  
pages 14-16, as originally filed  
pages NONE, as amended (together with any statement) under Article 19  
pages NONE, filed with the demand  
pages NONE, filed with the letter of
- ☒ the drawings:  
pages NONE, as originally filed  
pages NONE, filed with the demand  
pages NONE, filed with the letter of
- ☒ the sequence listing part of the description:  
pages NONE, as originally filed  
pages NONE, filed with the demand  
pages NONE, filed with the letter of

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.  
These elements were available or furnished to this Authority in the following language  which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

## 3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☒ The amendments have resulted in the cancellation of:

- ☒ the description, pages NONE
- ☒ the claims, Nos. NONE
- ☒ the drawings, sheets/fig NONE

5. ☐ This report has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\*

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

\*\*Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US00/19863

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. statement**

Novelty (N)

Claims 2-12 YESClaims 1 NO

Inventive Step (IS)

Claims 2-12 YESClaims 1 NO

Industrial Applicability (IA)

Claims 1-12 YESClaims none NO**2. citations and explanations (Rule 70.7)**

Claim 1 lacks novelty under PCT Article 33(2) as being anticipated by Voigt et al.

Voigt et al disclose processes of preparing tetrafluoroethane (TFE) by pyrolysis of fluorocarbons, followed by separation of TFE and recycling residual starting material into the first step (see column 1, lines 11-45).

Claims 2-12 meet the criteria set out in PCT Article 33(2)-(4), because the prior art does not teach or fairly suggest the claimed process steps for the production of the specific fluorocarbons from the starting materials recited.

----- NEW CITATIONS -----  
NONE

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US00/19863

**Supplemental Box**

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet

**CLASSIFICATION:**

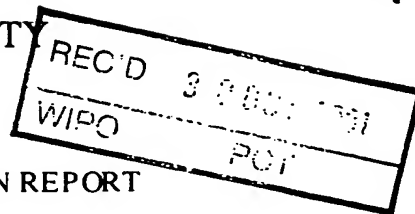
The International Patent Classification (IPC) and/or the National classification are as listed below:  
IPC(7): C07C 17/00, 17/26, 17/30, 19/08, 21/18 and US Cl.: 570/134, 135, 136, 151, 153, 155, 160, 163, 171, 172

# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)



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International Patent Classification (IPC) or national classification and IPC Please See Supplemental Sheet.		
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3.	This report contains indications relating to the following items:  I <input checked="" type="checkbox"/> Basis of the report II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of report with regard to novelty, inventive step or industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application

Date of submission of the demand  <b>21 FEBRUARY 2001</b>	Date of completion of this report  <b>28 SEPTEMBER 2001</b>
Name and mailing address of the IPEA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231  Facsimile No. (703) 305-3230	Authorized officer  <b>EDWARD CAIN</b>  Telephone No. (703) 308-0661  Jean Proctor Paralegal Specialist

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US00/19863

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pages 1-13, as originally filed  
pages NONE, filed with the demand  
pages NONE, filed with the letter of \_\_\_\_\_
- ☒ the claims:  
pages 14-16, as originally filed  
pages NONE, as amended (together with any statement) under Article 19  
pages NONE, filed with the demand  
pages NONE, filed with the letter of \_\_\_\_\_
- ☒ the drawings:  
pages NONE, as originally filed  
pages NONE, filed with the demand  
pages NONE, filed with the letter of \_\_\_\_\_
- ☒ the sequence listing part of the description:  
pages NONE, as originally filed  
pages NONE, filed with the demand  
pages NONE, filed with the letter of \_\_\_\_\_

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These elements were available or furnished to this Authority in the following language \_\_\_\_\_ which is:

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- ☐ furnished subsequently to this Authority in written form.
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**4. ☒ The amendments have resulted in the cancellation of:**

- ☒ the description, pages NONE
- ☒ the claims, Nos. NONE
- ☒ the drawings, sheets/fig. NONE

**5. ☐ This report has been drawn as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\***

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

\*\*Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US00/19863

## V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

### 1. statement

Novelty (N)

Claims 2-12 YES

Claims 1 NO

Inventive Step (IS)

Claims 2-12 YES

Claims 1 NO

Industrial Applicability (IA)

Claims 1-12 YES

Claims none NO

### 2. citations and explanations (Rule 70.7)

Claim 1 lacks novelty under PCT Article 33(2) as being anticipated by Voigt et al.

Voigt et al disclose processes of preparing tetrafluoroethane(TFE) by pyrolysis of fluorocarbons, followed by separation of TFE and recycling residual starting material into the first step(see column 1, lines 11-45).

Claims 2-12 meet the criteria set out in PCT Article 33(2)-(4), because the prior art does not teach or fairly suggest the claimed process steps for the production of the specific fluorocarbons from the starting materials recited.

----- NEW CITATIONS -----

NONE

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US00/19863

**Supplemental Box**

(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of: Boxes I - VIII

Sheet 10

**CLASSIFICATION:**

The International Patent Classification (IPC) and/or the National classification are as listed below:

IPC(7): C07C 17/00, 17/26, 17/30; 19/08, 21/18 and US Cl.: 570/134, 135, 136, 151, 153, 155, 160, 163, 171, 172



(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
1 February 2001 (01.02.2001)

PCT

(10) International Publication Number  
**WO 01/07384 A1**

(51) International Patent Classification<sup>7</sup>: C07C 17/00,  
17/26, 17/30, 19/08, 21/18

(74) Agent: BRISCOE, Kurt, G.; Norris McLaughlin & Mar-  
cus, 660 White Plains Road, Tarrytown, NY 10591-5144  
(US).

(21) International Application Number: PCT/US00/19863

(22) International Filing Date: 21 July 2000 (21.07.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/144,739 21 July 1999 (21.07.1999) US

(71) Applicant (for all designated States except US): HALO-  
CARBON PRODUCTS CORPORATION [US/US]; 887  
Kinderkamack Road, River Edge, NJ 07661 (US).

(81) Designated States (national): AL, AM, AT, AU, AZ, BA,  
BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES,  
FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,  
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG,  
MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE,  
SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN,  
YU, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM,  
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian  
patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European  
patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE,  
IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG,  
CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

(72) Inventors; and

(75) Inventors/Applicants (for US only): SPRAGUE, Lee  
[US/US]; 1316 Buena Vista Road, Augusta, GA 30909  
(US). GRAHAM, Daniel [US/US]; 4137 Meriden Av-  
enue, Martinez, GA 30907 (US). FERSTANDIG, Louis  
[US/US]; 1425 NW 28 Avenue, Delray Beach, FL 33445  
(US).

Published:

— With international search report.

For two-letter codes and other abbreviations, refer to the "Guid-  
ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.

(54) Title: PRODUCTION OF ALIPHATIC FLUOROCARBONS

(57) Abstract: Processes for preparing a variety of fluorocarbons are disclosed. Processes are described wherein the yields of desired products are increased by endlessly converting the undesired products to reactive intermediates. Trifluoroethylene is prepared in greater than 50 % yield by pyrolyzing 1-chloro-2,2,2-trifluoroethane at a temperature about 725 °C. 1,1,1,3,3-Pentafluoro-propylene is prepared by pyrolyzing 1-chloro-2,2,2-trifluoroethane in the presence of chlorodifluoromethane. Trifluoroethylene is prepared by pyrolyzing 1,2,2,2-tetrafluoroethane. 1-Chloro-2,2-difluoroethylene is prepared by pyrolyzing 1-chloro-2,2,2-trifluoroethane. 1,1-Dichloro-2,2-difluoroethylene is prepared by pyrolyzing 1-chloro-2,2,2-trifluoroethane in the presence of chlorodifluoro-methane and hydrogen chloride. 1,1,1,2,3,4,4,4-Octafluoro-2-butene is prepared by pyrolyzing 1-chloro-1,2,2,2-tetrafluoroethane. 1,1,1,2,3,4,4,4-Octafluoro-2-butene is prepared by pyrolyzing, 1,1,2,2,2-pentafluoroethane. 1,2,2,2-Tetrafluoroethane is prepared by pyrolyzing 1,1,2,2,2-pentafluoroethane. 1,1-Dichloro-1,2,2,2-tetrafluoroethane is prepared by pyrolyzing 1-chloro-1,2,2,2-tetrafluoroethane.

WO 01/07384 A1

## PATENT COOPERATION TREATY

PCT

## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Commissioner  
 US Department of Commerce  
 United States Patent and Trademark  
 Office, PCT  
 2011 South Clark Place Room  
 CP2/5C24  
 Arlington, VA 22202  
 ETATS-UNIS D'AMERIQUE  
 in its capacity as elected Office

<b>Date of mailing (day/month/year)</b> 17 May 2001 (17.05.01)	
<b>International application No.</b> PCT/US00/19863	<b>Applicant's or agent's file reference</b>
<b>International filing date (day/month/year)</b> 21 July 2000 (21.07.00)	<b>Priority date (day/month/year)</b> 21 July 1999 (21.07.99)
<b>Applicant</b> SPRAGUE, Lee et al	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:  
 21 February 2001 (21.02.01)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland	Authorized officer Pascal Piriou
Facsimile No.: (41-22) 740.14.35	Telephone No.: (41-22) 338.83.38

## PATENT COOPERATION TREATY

PCT

NOTIFICATION OF THE RECORDING  
OF A CHANGE(PCT Rule 92bis.1 and  
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

BRISCOE, Kurt, G.  
Norris McLaughlin & Marcus  
220 East 42nd Street, 30th Floor  
New York, NY 10017  
ETATS-UNIS D'AMERIQUE

Date of mailing (day/month/year) 06 October 2001 (06.10.01)	<b>IMPORTANT NOTIFICATION</b>
Applicant's or agent's file reference	
International application No. PCT/US00/19863	International filing date (day/month/year) 21 July 2000 (21.07.00)

## 1. The following indications appeared on record concerning:

☐ the applicant      ☐ the inventor      ☒ the agent      ☐ the common representative

## Name and Address

BRISCOE, Kurt, G.  
Norris McLaughlin & Marcus  
660 White Plains Road  
Tarrytown, NY 10591-5144  
United States of America

## State of Nationality

## State of Residence

## Telephone No.

(914) 332-1700

## Facsimile No.

(914) 332-1844

## Teleprinter No.

## 2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☐ the person      ☐ the name      ☒ the address      ☐ the nationality      ☐ the residence

## Name and Address

BRISCOE, Kurt, G.  
Norris McLaughlin & Marcus  
220 East 42nd Street, 30th Floor  
New York, NY 10017  
United States of America

## State of Nationality

## State of Residence

## Telephone No.

(212) 808-0700

## Facsimile No.

(212) 808-0844

## Teleprinter No.

## 3. Further observations, if necessary:

## 4. A copy of this notification has been sent to:

<input checked="" type="checkbox"/> the receiving Office	<input type="checkbox"/> the designated Offices concerned
<input type="checkbox"/> the International Searching Authority	<input checked="" type="checkbox"/> the elected Offices concerned
<input checked="" type="checkbox"/> the International Preliminary Examining Authority	<input type="checkbox"/> other:

<b>The International Bureau of WIPO</b> 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer S. Mafla (Fax 338.87.40) Telephone No.: (41-22) 338.83.38
--	--

## INTERNATIONAL SEARCH REPORT

International application N.  
PCT/US00/19863

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : C07C 17/00, 17/26, 17/30, 19/08, 21/18

US CL : 570/134, 135, 136, 151, 153, 155, 160, 163, 171, 172

According to International Patent Classification (IPC) r to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 570/134, 135, 136, 151, 153, 155, 160, 163, 171, 172

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
none

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WEST

search terms: fluorocarbon, perfluorocarbon, freon, pyrolysis, recycle

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4,898,645 A (VOIGHT et al) 06 February 1990, abstract and claims.	1-12
Y	US RE29,534 A (RESNICK) 07 February 1978, abstract and claims.	1-12

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
*A* document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
*E* earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*G* document member of the same patent family
*O* document referring to an oral disclosure, use, exhibition or other means	
*P* document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

07 SEPTEMBER 2000

Date of mailing of the international search report

20 SEP 2000

Name and mailing address of the ISA/US  
Commissioner of Patents and Trademarks  
Box PCT  
Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

EDWARD CAIN

Telephone No. (703) 308-0661

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US00/19863

**A. CLASSIFICATION OF SUBJECT MATTER**

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US CL : 570/134, 135, 136, 151, 153, 155, 160, 163, 171, 172

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 570/134, 135, 136, 151, 153, 155, 160, 163, 171, 172

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
none

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WEST

search terms: fluorocarbon, perfluorocarbon, freon, pyrolysis, recycle

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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*E* earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
*L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*G* document member of the same patent family
*O* document referring to an oral disclosure, use, exhibition or other means	
*P* document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

07 SEPTEMBER 2000

Date of mailing of the international search report

20 SEP 2000

Name and mailing address of the ISA/US  
Commissioner of Patents and Trademarks  
Box PCT  
Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

EDWARD CAIN

Telephone No. (703) 308-0661